Section 7 Wood Taxa Identification

7.1 Introduction

This project included an extensive effort at charcoal taxa analysis carried out by Gail Murakami of the International Archaeological Research Institute, Inc. The purpose of the analysis was to determine the taxa of the charcoal for two purposes: 1) to aid in the selection of charcoal samples for radio-carbon dating; and, 2) to inform regarding the plant species present in the environment to aid in a re-construction of the environment during pre-Contact times. This presentation briefly summarizes the rationale for the work, presents data from the few available prior studies in the immediate vicinity, presents a summary of the results, and then presents the detailed results by Test Excavation and specific provenience.

The particular import of this work for paleo-environmental reconstruction is addressed in a more detailed analysis in the Paleo-environmental Reconstruction Section of this study (where the results of charcoal taxa identification are taken into consideration along with the results of pollen analysis).

7.1.1 Charcoal Taxa Identification as an Aid to Selection of Samples for Radio-carbon Dating

The validity of previously reported carbon dates from Polynesian sites has been called into question by many authors with a call for greater “chronometric hygiene” (Spriggs and Anderson 1993). Subsequent re-dating of Polynesian sites has led to a consensus that the dates previously reported for many Polynesian sites from radio-carbon dating were erroneously early (Kirch and McCoy 2007 :196)

There are many explanations for erroneously early dates (dating of “unacceptable materials”, marine reservoir carbon uptake, natural burning of ancient tree roots, inadequate pre-treatment) but one re-current explanation has been with reference to an “old wood problem”. The concern with the old wood problem is that wood from comparatively long-lived species and from relatively durability timber types can yield dates that are anomalously early by several centuries (reflecting when the long-lived, durable species lived rather than when the wood was burned (Anderson 1991:780-781) The work of Tom Dye (1998, 2000), in particular, has emphasized this as a problem in Hawai‘i.

Hence one purpose of the charcoal taxa analysis was to weed out “old wood” by facilitating the identification of charcoal from relatively short lived Hawaiian species. Charcoal from long-lived Hawaiian species (such as koa, *Acacia koa*) would not be dated. Charcoal from exotic wood such as conifers (pine, fir) and temperate hard woods was not to be dated on the basis that such wood would either have been the result of the post-Contact importation of lumber or the result of the burning of driftwood, which is regarded as having a higher probability of being “old wood.” By inference, wood charcoal samples found in the same provenience as exotic lumber was not dated as more likely to be post-Contact.

7.1.2 Charcoal Taxa Identification as an Aid to Environmental Reconstruction

Environmental reconstruction can be undertaken as if the species present in charcoal were an indicator of the immediate environment. The general premise is that typically people will not carry wood to burn as fuel very far. Hence the concept is that typically the species indicated in charcoal taxa analysis grew within a kilometer or so of where the wood was burned. This may not always be so due to a variety of factors, which are explored in the Paleo-environmental Reconstruction Section of this study.

7.2 Methods

The freshly fractured transverse and tangential facets of each charcoal piece in the HHCTCP City Center samples were viewed under magnification of a dissecting microscope. Taxa identifications were made by comparing the anatomical characteristics seen during examination against those of known woods in the Pacific Islands Wood Collection at the Department of Botany, University of Hawai‘i at Mānoa, and published descriptions.

7.3 Prior Studies of Wood/Charcoal Identification Along the HHCTCP City Center Alignment

There have been relatively few prior studies of the botanical identification of wood samples previously reported from the immediate vicinity of the HHCTCO City Center Transit Alignment. Two of the more substantive studies are discussed below.

7.3.1 Kekaulike Revitalization Project Data Recovery (Riley et al. 1995)

As part of the Kekaulike Revitalization Project data recovery work (Riley et al. 1995, Appendix F Botanical Identification of Wood Samples) identification of four samples of uncharred wood was undertaken by Gail Murakami of the International Archaeological Research Institute, Inc. Identifications (Riley et al. 1995 Appendix F1) are summarized as follows:

Table 261. Taxa identification for the Kekaulike Revitalization Project data recovery work

Context	Taxa	Comment
Block C Units J6/J5 Layer Vii, Level 2 180 cmbd	*Syzgium* sp.	Analysis was not conclusive whether the Polynesian introduction *S. malaccense (‘ōhi‘a ‘ai*) or the native *S. sandwicensis* was represented, appears to be *‘ōhi‘a ‘ai*
Block C Unit D4, Layer V, Level 1, 120 cmbd	*Rauvolfia sandwicensis* (*hao*)	An endemic tree or shrub, 3-10 m tall
Block B Makai, Unit B2 “Under P”, 158-163 cmbd	*Pritchardia* sp. (*loulu*)	Endemic palm, various uses (thatching, esp. for ceremonial houses, basket weaving, seeds were eaten, wood for battle spears)
Block B Units A1 and A2, pond wall, Layer V, level 3, 150 cmbd	*Cordia subcordia* (*kou*)	Polynesian introduction, a favorite shade tree (wood used for bowls platters utensils)

An attempt was made to compare the reported radiocarbon date proveniences from the Riley et al. (1995) data recovery study with the reported proveniences for the wood identifications but there appear to be no one-to-one correspondences and no effort was expended to interpolate dates as they may relate to the wood samples analyzed for taxa identification. Thus the time-frame represented by these wood samples is not clear. If indeed the *Syzgium* sp. is *‘ōhi‘a ‘ai* then that wood sample and the *kou* would need to post-date Polynesian arrival.

Athens and Ward (1994) carried out paleo-environmental investigations associated with the Riley et al. (1995) data recovery study that involved identification of one wood sample (*Diospyros* sp., probably *Diospyros sandwicensis* or *lama*). This sample was from a core and dated to 2330 +/- 60 (Athens and Ward 1994:14)) or well before human settlement. Because of the context it seems probable this *lama* plant lived in the future Kekaulike block prior to Polynesian arrival.

7.3.2 Kekaulike Diamond Head Block Data Recovery Goodwin and Allen 2005

The Goodwin and Allen (2005:445) data recovery work reports the identification of 34 taxa from 45 charcoal samples from a Kekaulike Diamond Head block project (SIHP 50-80-14-4875) in downtown Honolulu. Most of the taxa identified were also identified in the present study. Taxa identified in the Goodwin and Allen (2005:453) data recovery work that were not reported in the present study include:

- *Ilex anomala* (*kāwa‘u*),
- *Calophyllum inophyllum* (*kamani*),
- *Antidesma pulvinatum* (*hame*),
- *Acacia koa* (*koa*),
- *Abutilon* sp. (*ma‘o*),
- *Nestegis sandwicensis*,(*olopua*),
- *Pandanus tectorus* (*hala*),
- *Canthium odoratum* (*alahe‘e*), and
- a variety of post-Contact species.

Environmental change is touched on (Goodwin and Allen 2005:16) but was not a research focus.

7.4 Results of Charcoal Taxa Analysis

A summary of charcoal taxa identified in the course of the HHCTCP City Center archaeological inventory survey is presented in the following Table 262. Subsequently, in Table 263, a detailed inventory of all taxa identified is presented by individual provenience in numeric order by test excavation number. A summary of taxa identified is then presented in order of botanical family (in standard botanical ordering) with a brief discussion of the taxa represented in each family along with the indicated preferred environment and traditional Hawaiian uses.

The results of charcoal taxa species identified areintegrated with the pollen analysis results within a review of paeo-envrionmental reconstruction in Volume I of this study.

Table 262. Charcoal Taxa Identified

Taxon	Common/Hawaiian Name	Origin/ Habitat
Aleurites moluccana	*Kukui*	Polynesian Introduction/Tree
Artocarpus altilis	*Ulu*	Polynesian Introduction/Tree
Bobea sp.	*‘Ahakea*	Native/Tree
Chamaesyce sp.	*Akoko*	Native/Shrub
Chenopodium oahuense	*‘Āheahea, ‘āweoweo*	Native/Shrub
Cocos nucifera	*Niu, coconut*	Polynesian Introduction/Tree
Coprosma sp.	*Pilo*	Native/Shrub-Tree
Cordyline terminalis	*Kī, ti*	Polynesian Introduction/Shrub
Diospyros sandwicensis	*Lama*	Native/Tree
Dodonaea viscosa	*‘A‘ali‘i*	Native/Shrub
Hibiscus tiliaceus	*Hau*	Native/Shrub-Tree
Lagenaria siceraria	*Ipu*	Polynesian Introduction/Vine
Metrosideros polymorpha	*‘Ōhi‘a lehua*	Native/Tree
Myoporum sandwicensis	*Naio*	Native/Tree
Osteomeles anthyllidifolia	*‘Ulei*	Native/Shrub
Pittosporum sp.	*Hō‘awa*	Native/Tree
Poaceae	Grass	
Pritchardia sp.	*Loulu*	Native/Tree
Psychotria sp.	*Kōpiko*	Native/Tree
Pteridophyta	Fern	
Rauvolfia sandwicensis	*Hao*	Native/Shrub-Tree
Senna sp.	*Kolomona*	Native+Historic Introductions
Sida fallax	*‘Ilima*	Native/Shrub
Styphelia tameiameaie	*Pūkiawe*	Native/Shrub
Syzygium sp.	Mountain apple, roseapple, Java plum, *‘ōhi‘a ai*	Native + Historic Introductions/Tree
Wikstroemia sp.	*‘Ākia*	Native/Shrub

Table 263 Charcoal Taxa Identified Test Excavation Provenience

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-20; Dillingham Blvd, west of intersection with Laumaka Street, Feature A, 235-250 cmbs, Stratum II	1223-1	*Diospyros sandiwicensis*	*Lama*	Native/Tree	Wood	8	5.07
	1223-2	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	2	1.23
	1223-3	cf. *Dodonaea viscosa*	*‘A‘ali‘i*	Native/Shrub	Wood	6	4.60
	1223-4	cf. *Osteomeles anthyllidifolia*	*‘Ulei*	Native/Shrub	Wood	1	1.55
	1223-5	cf. *Pittosporum* sp.	*Hō‘awa*	Native/Tree	Wood	4	3.22
T-020A; Kamehameha Highway, near intersection with Laumaka Street, Sample 1: 230-234 cmbs, Stratum II	1302-2	*Styphelia tameiameaie*	*Pūkiawe*	Native/Shrub	Wood	15	0.82
	1302-3	cf. *Dodonaea viscosa*	*‘A‘ali‘i*	Native/Shrub	Wood	19	2.42
	1302-4	cf. *Osteomeles anthyllidifolia*	*‘Ūlei*	Native/Shrub	Wood	7	0.06
T-028	cf. Conifir (in this one case analysis stopped after the identification of non-Hawaiian wood)		Pine, fir	Historic Introduction/ Tree	Wood		
T-075; Dillingham Boulevard, west of Alakawa Street, Sample 2: 168-195 cmbs, Stratum IIb	1302-5	cf. *Myoporum sandwicensis*	*Naio*	Native/Tree	Wood	3	0.23
	1302-6	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	3	0.33
	1302-7	Not identified			cf. Pith	1	0.01
	1302-8	Conifer	Pine, fir, etc.	Historic Introduction/ Tree	Wood	1	<0.01

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-078; Dillingham Boulevard, east of Alakawa Street	1302-9	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	3	0.11
	1302-10	cf. *Cocos nucifera*	*Niu*, coconut	Native/Tree	Wood	2	0.02
	1302-11	Conifer	Pine, fir, etc.	Historic Introduction/ Tree	Wood	1	<0.01
T-119A; Halekauwila Street, between Punchbowl and Mililani Streets, Sample 4: 80-93 cmbs, Stratum IIa	1302-12	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions	Wood	2	0.03
	1302-13	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	2	0.09
	1302-14	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/ Tree	Nut-shell	1	0.08
	1302-15	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	7	0.27
T-119A; Halekauwila Street, between Punchbowl and Mililani Streets, Sample 5: 125-150 cmbs, Stratum IIa/IIb	1302-16	Unknown 1			Wood	1	0.05
	1302-17	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions	Wood	3	0.05
	1302-18	cf. *Psychotria* sp.	*Kōpiko*	Native/Tree	Wood	3	0.22
	1302-19	Unknown 2			Stem	1	0.05
	1302-20	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	1	0.04
	1302-21	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/ Tree	Nut-shell	1	0.03

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-119A; Sample 5: 125-150 cmbs, Stratum IIa/IIb (cont.)	1302-22	cf. *Lagenaria siceraria*	*Ipu*	Polynesian Introduction/ Vine	Fruit rind	1	<0.01
	1302-23	*Chenopodium oahuense*	*‘Āheahea, ‘āweoweo*	Native/Shrub	Wood	1	<0.01
	1302-24	cf. *Syzygium* sp.	Mountain apple, roseapple, Java plum, *‘ōhi‘a ai*	Native + Historic Introductions/ Tree	Wood	1	0.02
T-120; Halekauwila Street, west of Punchbowl Street intersection, Sample 1: Feature C, 112-126 cmbs, Stratum II	1228-1	*Aleurites moluccana*			Nut-shell	11	0.32
	1228-2	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	2	
	1228-3	Monocot			Stem ?	9	
	1228-4	cf. *Wikstroemia* sp.	*‘Ākia*	Native/Shrub	Wood	3	
	1228-5				Wood	13	
	1228-6				Wood	10	
	1228-7				Wood	2	
	1228-8	*Sida fallax*	*‘Ilima*	Native/Shrub	Wood	9	0.17
	1228-9	*cf. Osteomeles anthyllidifolia*	*‘Ūlei*	Native/Shrub	Wood	1	
	1228-10	*cf. Pritchardia sp.*	*Loulu*	Native/Tree	Wood	8	
	1228-11	*Chenopodium oahuense*	*‘Aheahea, ‘aweoweo*	Native/Shrub	Wood	6	0.12

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-120; Sample 1: Feature C, 112-126 cmbs, Stratum II (cont.)	1228-12	*cf. Lagenaria siceraria*	*ipu*	Polynesian introduction/ vine	Fruit rind	1	<0.01
	1228-13	*cf. Coprosma sp.*	*Pilo*	Native/Shrub-Tree	Wood	1	
	1228-14	*Chamaesyce sp.*	*Akoko*	Native/Shrub	Wood	2	
	1228-15	*cf. Bobea sp.*	*‘Ahakea*	Native/Tree	Wood	3	
	1228-16				Wood	15	
	1228-17				Wood	3	
	1228-18				Wood	4	
T-120; Halekauwila Street, west of Punchbowl Street intersection, Sample 2: Feature D, 110-118 cmbs, Stratum II	1228-19	[interesting stem]			Stem		
	1228-20	*Aleurites moluccana*	*Kukui*	Polynesian Intro/Tree	Nutshell	20	2.28
	1228-21				Wood		
	1228-22				Wood		
	1228-23	Not identified			Bark		
	1228-24	*Chamaesyce sp.*	*Akoko*	Native/Shrub	Wood	3	0.49
	1228-25	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood		
	1228-26				Wood		
	1228-27	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood		
	1228-28				Wood		
	1228-29	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	5	0.21
	1228-30				Wood		
	1228-31	cf. *Coprosma sp.*	*Pilo*	Native/Shrub-Tree	Wood		

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-120; Halekauwila Street, west of Punchbowl Street intersection, Sample 3: Feature F, 104-107 cmbs, Stratum II	1228-101	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	4	0.44
	1228-102				Wood		
	1228-103	*Aleurites moluccana*	*Kukui*	Polynesian Intro./ Tree	Nut-shell	17	1.04
	1228-104	*Chenopodium oahuensis*	*Āheahea, ‘āweoweo*	Native/Shrub	Wood	1	0.04
	1228-105	cf. *Dodonaea viscosa*	*‘A‘ali‘i*	Native/Shrub	Wood	11	1.03
	1228-106				Wood		
	1228-107	cf. *Pteridophyta*	Fern		Stem		
	1228-108				Wood		
	1228-109				Wood		
	1228-110				Wood		
	1228-111				Wood		
	1228-112				Wood		
	1228-113				Wood		
T-120A; Halekauwila Street, between Punchbowl and Mililani Streets Sample 6: 110-118 cmbs, Stratum II	1302-25	cf. *Psychotria* sp.	*Kōpiko*	Native/Tree	Wood	10	0.83
	1302-26	cf. *Syzygium* sp.	Mountain apple, roseapple, Java plum, *‘ōhi‘a ai*	Native + Historic Introductions/ Tree	Wood	3	0.22
	1302-27	cf. *Osteomeles anthyllidifolia*	*‘Ūlei*	Native/Shrub	Wood	5	0.53
	1302-28	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	7	0.63
	1302-29	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions/ Shrub-Tree	Wood	6	0.36

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-120A; Sample 6: 110-118 cmbs, Stratum II (cont.)	1302-30	cf. *Artocarpus altilis*	*Ulu*	Polynesian Introduction/Tree	Wood	3	0.11
	1302-31	cf. *Dodonaea viscosa*	*‘A‘ali‘i*	Native/Shrub	Wood	4	0.12
	1302-32	cf. *Rauvolfia sandwicensis*	*Hao*	Native/Shrub-Tree	Wood	4	0.16
	1302-33	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nutshell	3	0.08
	1302-35	cf. *Coprosma* sp.	*Pilo*	Native/Shrub-Tree	Wood	1	0.02
	1302-36	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	1	0.04
	1302-37	Unknown 3				1	0.02
	1302-38	*Diospyros sandwicensis*	*Lama*	Native/Tree	Wood	1	0.03
T-120A; Halekauwila Street, between Punchbowl and Mililani Streets, Sample 7: Feature 1, 128-136 cmbs, Stratum II	1302-39	cf. *Psychotria* sp.	*Kōpiko*	Native/Tree	Wood	1	0.08
	1302-40	Not identified			Bark	2	0.18
	1302-41	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	2	0.08
	1302-42	cf. *Coprosma* sp.	*Pilo*	Native/Shrub-Tree	Wood	1	0.04
T-120A; Halekauwila Street, between Punchbowl and Mililani Streets, Sample 8: Feature 2, 125-137 cmbs, Stratum II	1302-43	*Chenopodium oahuense*	*‘Āheahea, ‘āweoweo*	Native/Shrub	Wood	2	0.49
	1302-44	cf. *Syzygium* sp.	Mountain apple, roseapple, Java plum, *‘ōhi‘a ai*	Native + Historic Introductions/Tree	Wood	4	0.78

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-120A, Sample 8: Feature 2, 125-137 cmbs, Stratum II (cont.)	1302-45	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nut-shell	2	0.35
	1302-46	*Diospyros sandwicensis*	*Lama*	Native/Tree	Wood	1	0.05
	1302-47	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions/			
	1302-48	cf. *Psychotria* sp.	*Kōpiko*	Native/Tree	Wood	1	0.15
	1302-49	cf. *Dodonaea viscosa*	*‘A‘ali‘i*	Native/Shrub	Wood	2	0.56
T-120A; Halekauwila Street, between Punchbowl and Mililani Streets, Sample 9: Feature 4, 128-132 cmbs, Stratum II	1302-50	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	10	3.43
	1302-51	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions/ Shrub-Tree	Wood	20	1.09
	1302-52	cf. *Dodonaea viscosa*	*‘A‘ali‘i*	Native/Shrub	Wood	3	0.20
	1302-53	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	2	0.46
	1302-54	cf. *Artocarpus altilis*	*Ulu*	Polynesian Intro./ Tree	Wood	2	0.37
	1302-55	cf. Arecaceae	Palm		Peti-ole	5	0.26
	1302-56	cf. *Aleurites moluccana*	*Kukui*	Polynesian Intro./ Tree	Wood	6	0.40
	1302-57	cf. Arecaceae	Palm		Wood	1	0.08
	1302-58	Unknown 4			Wood	2	0.19
	1302-59	Not identified			cf. tuber	1	<0.01
	1302-60	Poaceae	Grass		Stolon	1	0.04
	1302-61	Unknown 3			Wood	10	0.39

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-124; Halekauwila Street, between Punchbowl and South Streets, Sample 4 Feature 1, 138-144, Stratum IIa	1228-32			Native/Tree	Wood		
	1228-33	cf. *Cordyline terminalis*	*Kī,* ti	Polynesian Introduction/ Tree	Stem	3	0.16
	1228-34	*Chenopodium oahuensis*	*Āheahea, ‘āweoweo*	Native/Shrub	Wood	6	0.18
	1228-35				Wood		
	1228-36				Wood		
	1228-37	cf. *Syzygjum sp.*	Mountain apple, roseapple, Java plum, *‘ōhi‘a ‘ai*	Native + Historic Introductions, Tree	Wood		
	1228-38				Wood		
	1228-39	*Cocos nucifera*	*Niu*, coconut	Polynesian Introduction/ Tree	Nutshell	1	0.04
	1228-40	Monocot			Stem		
	1228-41	*Chamaesyce sp.*	*Akoko*	Native/Shrub	Wood		
T-124; Halekauwila Street, between Punchbowl and South Streets, Sample 5 Feature 2, 118-125, Stratum IIa	1228-42				Wood		
	1228-43	Monocot			Wood		
	1228-44				Wood		
	1228-45				Wood		

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-124, Sample 5 Feature 2, 118-125, Stratum IIa (cont.)	1228-46	cf. *Syzygjum* sp.	Mountain apple, roseapple, Java plum, *‘ōhi‘a ‘ai*	Native + Historic Introductions, Tree	Wood		
	1228-47				Wood		
	1228-48	Not identified			Bark		
	1228-49				Wood		
	1228-50				Wood		
	1228-51	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood		
	1228-52				Cf. tuber		
	1228-53	cf. *Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	2	0.05
	1228-54	*Chenopodium oahuensis*	*Āheahea, ‘āweoweo*	Native/Shrub	Wood	1	0.02
	1228-55	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	3	0.05
	1228-56	*Diospyros sandiwicensis*	*Lama*	Native/Tree	Wood		
T-124; Halekauwila Street, between Punchbowl and South Streets, Feature 5, 140-163 cmbs, Stratum IIb	1223-9	*Diospyros sandiwicensis*	*Lama*	Native/Tree	Wood	3	1.64
	1223-10	cf. *Dodonaea viscosa*	*‘A‘ali‘i*	Native/Shrub	Wood	3	0.28
	1223-11	*Chenopodium oahuensis*	*Āheahea, ‘āweoweo*	Native/Shrub	Wood	1	0.10
	1223-12	cf. *Aleurites moluccana*	*Kukui*	Polynesian Introduction/ Tree	Wood	1	0.07
	1223-13	Unknown legume	-	-	Wood	1	0.02

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-124; Halekauwila Street, between Punchbowl and South Streets, Feature 11, 120-132, Stratum IIb	1223-6	*Diospyros sandiwicensis*	*Lama*	Native/Tree	Wood	1	0.12
	1223-7	*cf. Pittosporum sp.*	*Hō‘awa*	Native/Tree	Wood	7	2.15
	1223-8	Not identified	-	-	Cf. corm ?	1	0.48
T-141; Halekauwila Street, just south of Keawe Street intersection Feature 6, 75-95 cmbs, Stratum IIa	1228-57				Wood		
	1228-58	Cf. *Aleurites moluccana*	*Kukui*	Polynesian Introduction/	Wood		
	1228-59	Monocot			Stem		
T-142; Halekauwila Street, just south of Keawe Street intersection Feature 6, 55-70 cmbs, Stratum IIa	1228-60	*Cocos nucifera*	*Niu*, coconut	Polynesian Introduction/ Tree	Nut-shell	3	0.07
	1228-61	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/	Nut-shell	1	0.05
	1228-62	cf. *Aleurites moluccana*	*Kukui*	Polynesian Introduction/	Wood		
	1228-62a	cf. *Psychotria* sp.	Kōpiko	Native /Tree	Wood		
	1228-63	Monocot					
T-145, Halekauwila Street, between Keawe and Coral Streets, Sample 8: Feature 1, 81-95 cmbs, 1228-64 ? Stratum Ila	1228-64	?					
	1228-65				Wood		
	1228-66	Monocot					
	1228-67	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	5	0.08
	1228-68	*Diospyros sandiwicensis*	*Lama*	Native/Tree	Wood		

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-145, Halekauwila Street, between Keawe and Coral Streets, Sample 9: Feature 2, 95-110 cmbs, Stratum IIb	1228-69				Wood		
	1228-70				Wood		
	1228-71	Monocot					
	1228-72	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/ Tree	Nut-shell		
	1228-73	cf. Conifir	Pine, fir	Historic Introduction/ Tree	Wood		
T-146A; Halekauwila Street, between Coral and Cooke Streets Sample 10: Feature 2, 75-90, Stratum IIa	1302-62	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nut-shell	2	0.33
	1302-63	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	5	0.15
	1302-64	*Cocos nucifera*	*Niu*, coconut	Native/Tree	Nut-shell	2	0.14
	1302-65, 67	cf. *Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	2	0.02
	1302-66	cf. *Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Wood	3	0.03
	1302-68	Unknown 5			Wood	2	0.03
	1302-69	cf. *Dodonaea viscosa*	*‘A‘ali‘i*	Native/Shrub	Wood	1	<0.01

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-146A; Halekauwila Street, between Coral and Cooke Streets Sample 11: Feature 3, 83-94 cmbs, Stratum IIa	1302-70	Unknown 6			Wood	2	0.17
	1302-71	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions/ Shrub-Tree	Wood	3	0.22
	1302-72	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/ Tree	Nut-shell	2	0.08
	1302-73	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	2	0.04
	1302-74	Unknown 7			Wood	1	<0.01
	1302-75	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	1	<0.01
T-146A; Halekauwila Street, between Coral and Cooke Streets Sample 12: Feature 4, 85-95 cmbs, Stratum IIa	1302-76	*Cocos nucifera*	*Niu*, coconut	Native/Tree	Nut-shell	1	<0.01
	1302-77	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	1	<0.01
T-146A; Halekauwila Street, between Coral and Cooke Streets, Sample 13 Feature 5, 81-92 cmbs, Stratum IIa	1302-78	cf. *Aleurites moluccana*	*Kukui*	Polynesian Introduction/ Tree	Wood	2	0.19
	1302-79	Not identified			cf. Pith	1	0.04
	1302-80	Not identified			Bark	2	0.04
	1302-81	cf. *Coprosma* sp.	*Pilo*	Native/Shrub-Tree	Wood	1	<0.01
	1302-82	Unknown 7				3	0.18

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T -150, Halekauwila Street, just south of Cooke Street intersection, Sample 10: Feature 2, 70-75 cmbs, Stratum II	1228-74	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/ Tree	Nut-shell		
	1228-75				Wood		
	1228-76				Wood		
	1228-77	Not identified			cf. Bark		
	1228-78				Wood		
	1228-79						
	1228-80	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	1	0.05
	1228-81	Monoct					
	1228-82	*Chenopodium oahuensis*	*Āheahea, ‘āweoweo*	Native/Shrub	Wood	1	0.01
T -150, Halekauwila Street, just south of Cooke Street intersection, Sample 10: Feature 3, 90-130 cmbs, Stratum II	1228-83	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/ Tree	Nut-shell	2	0.07
	1228-84				Stem		
	1228-85				Wood		
T -151, Halekauwila Street, just south of Keawe Street intersection, Sample 12: Feature 6, 86-108 cmbs, Stratum IIa	1228-86	cf. *Bidens* sp.	*Ko‘oko‘olau*	Native+ Historic Introductions/Shrub	Wood	6	0.06
	1228-87				Wood		
	1228-88	*Aleurites moluccana*	*Kukui*	Polynesian Intro./ Tree	Nut-shell	2	<0.01
	1228-89				Wood		

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T -167, Ross Dress for Less Parking lot on Ward Avenue, Sample 13: Feature 3, 145-148 cmbs, Stratum IIa	1228-90				Wood		
	1228-91				Wood		
	1228-92				Wood		
	1228-93				Wood		
	1228-94				Wood		
	1228-95	cf. Conifer	Pine, fir	Historic Introduction/ Tree	Wood		
T -168B, Ross Dress for Less Parking lot on Ward Avenue, Sample 14: Feature 1, 160-165 cmbs, Stratum II	1228-96	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood		
	1228-97	cf. Conifer	Pine, fir	Historic Introduction/ Tree	Wood		
T-189; Kona and Pensacola Street intersection, warehouse lot Sample 14: 155-165 cmbs, Stratum IIIa	1302-83	Unknown 8			Wood	1	0.04
	1302-84	cf. *Rauvolfia sandwicensis*	*Hao*	Native/Shrub-Tree	Wood	1	0.03
	1302-85	Not identified			Bark	1	<0.01
	1302-86	cf. Temperate hardwood			Wood	2	0.01
	1302-87	cf. *Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Wood	1	<0.01
	1302-88	cf. Arecaceae	Palm		Wood	2	<0.01
	1302-89	cf. *Dodonaea viscosa*	*‘A‘ali‘i*	Native/Shrub	Wood	1	<0.01

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-226A; Punchbowl Street, *mauka* of intersection with Ala Moana Boulevard Sample 15: 60-97 cmbs, Stratum IIa	1302-90	Conifer	Pine, fir, etc.	Historic Introduction/Tree	Wood	1	0.22
	1302-91	Not identified			Bark	2	0.48
	1302-92	*Diospyros sandwicensis*	*Lama*	Native/Tree	Wood	1	0.08
	1302-93	cf. *Dodonaea viscosa*	*‘A‘ali‘i*	Native/Shrub	Wood	15	0.67
	1302-94	*Aleurites moluccana*	*Kukui*	Polynesian Intro./Tree	Nutshell	14	1.19
	1302-95	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	4	0.29
	1302-96	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	3	0.17
	1302-97	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions/ Shrub-Tree	Wood	3	0.13
	1302-98	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	6	0.35
	1302-99	Unknown 8			Wood	2	0.15
	1302-100	cf. Temperate hardwood			Wood	3	0.10
	1302-101	cf. *Myoporum sandwicensis*	*Naio*	Native/Tree	Wood		0.12
	1302-102	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	6	0.33
	1302-103	*Cocos nucifera*	*Niu*, coconut	Polynesian Intro./Tree	Nutshell	1	0.15
	1302-104	cf. *Syzygium* sp.	Mountain apple, roseapple, Java plum, *‘ōhi‘a ai*	Native + Historic Introductions/Tree	Wood	1	0.06

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-226A; Punchbowl Street, *mauka* of intersection with Ala Moana Boulevard Sample 16: Feature 1, 98-103 cmbs, Stratum IIa	1302-114	Cf. Temperate hardwood			Wood	5	0.24
	1302-115	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions/ Shrub-Tree	Wood	2	0.05
	1302-116	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	24	0.68
	1302-117	cf. *Psychotria* sp.	*Kōpiko*	Native/Tree	Wood	3	0.15
	1302-118	Unknown 9			Wood	2	0.05
	1302-119	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	6	0.14
	1302-120	cf. *Lagenaria siceraria*	*Ipu*	Polynesian Introduction/Vine	Fruit rind	1	0.04
	1302-121	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	1	0.02
	1302-122	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nutshell	6	0.28
	1302-123	Unknown 8			Wood	2	0.02
	1302-124	*Chenopodium oahuense*	*‘Āheahea, ‘āweoweo*	Native/Shrub	Wood	1	<0.01
	1302-125	*Pandanus tectorus*	*Hala*	Native/Tree	Fruit key	1	0.02
	1302-126	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	6	0.11

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-226A; Punchbowl Street, *mauka* of intersection with Ala Moana Boulevard Sample 17: Feature 2, 82-88 cmbs, Stratum IIa	1302-105	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nutshell	14	0.43
	1302-106	*Cocos nucifera*	*Niu*, coconut	Polynesian Introduction/Tree	Nutshell	4	0.12
	1302-107	Not identified			Bark	4	0.06
	1302-108	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	6	0.10
	1302-109	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	3	0.04
	1302-110	cf. *Artocarpus altilis*	*Ulu*	Polynesian Introduction/Tree	Wood	1	0.02
	1302-111	*Styphelia tameiameaie*	*Pūkiawe*	Native/Shrub	Wood	1	0.02
	1302-112	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	1	0.01
	1302-113	Conifer	Pine, fir, etc.	Historic Introduction/Tree	Wood	2	0.01
T-226A; Punchbowl Street, *mauka* of intersection with Ala Moana Boulevard Sample 18: Feature 3, 87-102 cmbs, Stratum IIa	1302-127	cf. Psychotria sp.	*Kōpiko*	Native/Tree	Wood	4	0.29
	1302-128	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nutshell	113	5.69
	1302-129	cf. *Cordyline terminalis*	*Kī*, ti	Polynesian Introduction/Shrub	Stem	8	0.51
	1302-130	cf. *Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	30	1.24

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T-226A; Sample 18: Feature 3, 87-102 cmbs, Stratum IIa (cont.)	1302-131, 143	cf. Temperate hardwood.			Wood	2	0.18
	1302-132	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	2	0.08
	1302-133	*Chenopodium oahuense*	*‘Āheahea, ‘āweoweo*	Native/Shrub	Wood	5	0.06
	1302-134	cf. *Artocarpus altilis*	*Ulu*	Polynesian Introduction/Tree	Wood	2	0.04
	1302-135	cf. *Osteomeles anthyllidifolia*	*‘Ūlei*	Native/Shrub	Wood	3	0.04
	1302-136	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	7	0.19
	1302-137	Not identified			cf. tuber	2	0.04
	1302-138	*Diospyros sandwicensis*	*Lama*	Native/Tree	Wood	2	0.04
	1302-139	Not identified			Bark	12	0.29
	1302-140	Poaceae	Grass		Stem	1	0.03
	1302-141	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions	Wood	6	0.14
	1302-142	cf. *Lagenaria siceraria*	*Ipu*	Polynesian Introduction/Vine	Fruit rind	1	0.03
	1302-144	Unknown 8			Wood	3	0.05
	1302-145	Unknown 10			Wood	4	0.04

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T226B; Punchbowl Street, at intersection with Ala Moana Boulevard Sample 1: Feature 1, 81-87 cmbs, Stratum II	1304-1	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	1	0.13
	1304-2	*Chenopodium oahuense*	*‘Āheahea, ‘āweoweo*	Native/Shrub	Wood	4	0.09
	1304-3	cf. *Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Wood	9	0.14
	1304-4	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nutshell	7	0.37
	1304-5	Unknown 1			Wood	1	0.09
	1304-6	cf. *Artocarpus altilis*	*Ulu*	Polynesian Introduction/Tree	Wood	2	0.05
	1304-7	cf. *Coprosma* sp.	*Pilo*	Native/Shrub-Tree	Wood	1	<0.01
	1304-8	Unknown 2			Twigs	15	0.26
T226B; Punchbowl Street, at intersection with Ala Moana Boulevard Sample 2: Feature 2, 80-90 cmbs, Stratum II	1304-9	Unknown 3			Wood	2	0.02
	1304-10	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	3	0.05
	1304-11	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions	Wood	1	0.02
	1304-12	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/ Tree	Nut-shell	2	0.05

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T226B; Punchbowl Street, at intersection with Ala Moana Boulevard Sample 3: Feature 3, 82-93 cmbs, Stratum II	1304-13	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	2	0.26
	1304-14	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	1	0.06
	1304-15	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nutshell	9	0.26
	1304-16	Poaceae	Grass		Cf. stolon	2	0.10
	1304-17	*Cocos nucifera*	*Niu*, coconut	Polynesian Introduction/Tree	Nutshell	3	0.06
	1304-18	cf. *Cordyline terminalis*	*Kī*, ti	Polynesian Introduction/Shrub	Wood	3	0.05
	1304-19	Unknown 2			Stem	2	0.03
	1304-20	cf. *Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Wood	1	0.03
T226B; Punchbowl Street, at intersection with Ala Moana Boulevard Sample 4: Feature 4, 80-95 cmbs, Stratum II	1304-21	*Cocos nucifera*	*Niu*, coconut	Polynesian Introduction/Tree	Nutshell	4	0.18
	1304-22	Unknown 4			Wood	1	0.04

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T226B; Punchbowl Street, at intersection with Ala Moana Boulevard Sample 5: Feature 5, 76-90 cmbs, Stratum II	1304-23	Unknown 1			Wood	1	0.09
	1304-24	*Cocos nucifera*	*Niu*, coconut	Polynesian Introduction/Tree	Nut-shell	1	0.06
	1304-25	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	4	0.12
	1304-26	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions	Wood	5	0.11
	1304-27	Unknown 2			Wood	2	0.03
	1304-28	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	1	<0.01
	1304-29	*Chenopodium oahuense*	*‘Āheahea, ‘āweoweo*	Native/Shrub	Wood	2	0.02
	1304-30	cf. *Cordyline terminalis*	*Kī*, ti	Polynesian Introduction/Shrub	Wood	2	<0.01
	1304-31	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nut-shell	2	<0.01
	1304-32	*Diospyros sandiwicensis*	*Lama*	Native/Tree	Wood	1	<0.01
	1304-33	Not identified			Cf. Tuber	1	<0.01
T226B; Punchbowl Street, at intersection with Ala Moana Boulevard Sample 6: Feature 6, 76-85 cmbs, Stratum II	1304-34	Unknown 5			Wood	1	<0.01
	1304-35	Unknown 6			Wood	1	<0.01
	1304-36	Monocotyledonae			Stem	2	<0.01

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight g
T226B; Punchbowl Street, at intersection with Ala Moana Boulevard Sample 7: Feature 7, 175-187 cmbs, Stratum II	1304-37	Not identified			Bark	1	<0.01
	1304-38	Unknown 4			Wood	2	0.05
	1304-39	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	6	0.08
	1304-40	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	4	0.04
T226B; Punchbowl Street, at intersection with Ala Moana Boulevard Sample 8: Feature 8, 78-94 cmbs, Stratum II	1304-41	Unknown 2			Wood	4	0.06
	1304-42	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions	Wood	2	0.03
	1304-43	*Cocos nucifera*	*Niu*, coconut	Polynesian Introduction/ Tree	Nut-shell	4	0.15
	1304-44	Not identified			Bark	1	0.03
	1304-45	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	3	0.06
	1304-46	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/ Tree	Nut-shell	1	0.03
T-227A; Punchbowl Street, near intersection with Pohukaina Street, Sample 19: Feature 2, 108-131 cmbs, Stratum IIa	1302-146	cf. *Psychotria* sp.	*Kōpiko*	Native/Tree	Wood	3	0.07
	1302-147	*Diospyros sandwicensis*	*Lama*	Native/Tree	Wood	1	<0.01
	1302-148	Not identified			Bark	1	<0.01

7.5 Taxa Identified by Botanical Family

AGAVACEAE

Cordyline fruticosa (L.) A. Chev. (*Kī*, ti}

This Polynesian introduction is a shrub cultivated in mesic valleys and forests of all the main Hawaiian Islands except Kaho‘olawe. The leaves, arranged in a close spiral at the tips of the stems, were used for house thatch, food wrappers, raincoats, and sandals (Wagner et al. 1990:1348-1349). The swollen fleshy roots were baked for food or, in the post-Contact period, used to produce an alcoholic beverage (Neal 1965:203).

APOCYNACEAE

Rauvolfia sandwicensis A. DC (*Hao*)

This endemic species is a tree or shrub, 3 to 10 m tall, found primarily in mesic forests but also in dry forest or dry shrub land and on lava flows, on all the main .awaiian Islands except Kaho‘olawe at 100- to 800-m elevations (Wagner et al. 1990: 220).

ARECACEAE

Cocos nucifera L. (*Niu*, coconut)

This Polynesian introduction is a palm that grows up to 30 m tall and is widely cultivated today. Coconut appears to be sparingly naturalized in coastal areas where it is thought to have been originally cultivated. All parts of the plant were used by the Hawaiians. Among the many uses are: house posts, drums, and food containers from the trunk; baskets, thatching, brooms, *kukui* nut lamp supports from parts·of the leaves; rope from the husk; utensils for eating or drinking from the shell; and the flesh and water of the fruit were eaten (Wagner et al. 1990:1362-1363).

Pritchardia sp.

The *loulu* or fan palms include 19 taxa endemic to the Hawaiian Islands. With two species known from O‘ahu (*P. kaalae*, *P. martii*) (Wagner et al. 1990:1364-1375). Pollen studies indicate these palms were formerly very abundant on O‘ahu.

CHENOPODIACEAE

Chenopodium oahuense (Meyen) Aellen (*‘Āheahea*, *‘āweoweo*)

This endemic species is usually a shrub in the coastal lowlands but may become arborescent at higher elevations (Hillebrand 1888:380). Its known distribution in the main Hawaiian Islands includes coastal, dry forest, and subalpine shrubland at 0 to 2,520 meters elevation (Wagner et al. 1990:538). The soft wood was probably not used by the ancient Hawaiians but the leaves were cooked and eaten as greens (Hillebrand 1888:380; Malo 1951:23).

CUCURBITACEAE

Lagenaria siceraria (Molina) Standi. (*Ipu*)

The fruit of this annual spreading vine, a native of tropical Asia or Africa, was brought to the Hawaiian Islands by the early Hawaiian settlers (Neal 1965:810). Smaller gourds were used as receptacles for food or water and rattles for dances, while larger gourds served as drums or places to hold *kapa* bark cloth or other articles (Pukui and Elbert 1986: I 03).

EBENACEAE

Diospyros sandwicensis (A. DC) Fosb. (*Lama*)

This small endemic tree, 2 to 10 m tall, is found in wet or dry regions of all the main Hawaiian Islands (Rock 1913:395; Wagner et al. 1990:587). Its hard wood was once used by Hawaiians for houses, enclosures for certain idols (Malo 1951:21), and chisel handles (Buck 1957:38). Hillebrand (1888:275) reported that the small fruits were eaten by the natives.

EPACRIDACEAE

Styphelia tameiameaie (*Pūkiawe*)

This trailing shrub often forms a principal component of vegetation in mesic forests, 15-3230 m (Wagner et al. 1990:590-591). “When a high-ranking chief wanted to mingle with commoners, he would enter a smoke house and be smudged with smoke of *pūkiawe* wood while a priest chanted a prayer for dispensation. The plant is often used in lei.” (Wagner et al. 1990:591).

EUPHORBIACEAE

Aleurites moluccana (L.) Willd. (*Kukui*)

Once cultivated, this Polynesian introduction has escaped into the native forest, where the pale foliage of the 10 to 20 m trees (Wagner et al. 1990:598) can be seen in abundance in moist gulches and valleys. Dyes were once extracted from the bark and roots (Buck 1957:187), the oily kernel was burned for light (Buck 1957:107) or eaten as a relish after baking (Buck 1957:48), and net floats and dugout canoes were made from the soft wood (Buck 1957:297).

Chamaecyse spp. (*‘Akoko*)

The distribution of the 15 endemic shrubs and small trees in this genus range from coastal environments to upper forest zones on the main Hawaiian Islands. Nine of these native species are found on O‘ahu.(Wagner et al. 1990:602-617; Rock 1913:243-262). *‘Akoko* was once valued for firewood by the Hawaiians (Hillebrand 1888:396). In the post-Contact period, the milky sap was once considered a possible source for rubber (Rock 1913:261).

FABACEAE

Senna sp.

One native shrub, *Senna gaudichaudii* (*kolomona*), and six naturalized species of *Senna* can be found on O‘ahu. The indigenous shrub *S. gaudichaudii* has been recorded primarily from leeward sites, but also rocky coastal sites, disturbed *hala* (*Pandanus*) forest, dry forest, and occasionally lower parts of the mesic forest (Wagner et al. 1990:698-702).

MALVACEAE

Hibiscus tiliaceus L. (Hau)

This indigenous plant is described by Handy and Handy (1972:232-233) as a “large leaved shrublike tree,” which was planted near houses and gardens. The straight-stemmed variety was planted for bast fibers from which cords, ropes, and coarse *kapa* cloth were made. Its soft wood was used to make canoe outriggers, fishnet floats, and fire by rubbing a harder wood against it. The creeping variety was used for windbreaks. This species occurs primarily along coasts, streams, and other wet areas up to 1,220 m in elevation (Wagner et al. 1990:888).

Sida fallax Walp. (*‘Ilima*)

This indigenous shrub was planted in the past, as it is today, near houses to provide flowers for *lei* making (Neal 1965:553). It has been found along coasts, on open lava fields, and in dry to mesic forests on all of the main Hawaiian Islands (Wagner et al. 1990:898). The entire plant had many uses for the native Hawaiians. The erect stems were tied to the frame of the sleeping house upon which *pili* grass (*Heteropogon contortus*) was lashed. Whole *‘ilima* bushes tied together were also used to secure mounds of taro plantings in swampy areas. The prostrate coastal *‘ilima* was used as floor coverings under mats (Handy and Handy 1972:228). The roots and flowers were used medicinally (Neal 1965:553).

MYOPORACEAE

Myoporum sandwicense A. Gray (*Naio*)

The habit of this indigenous tree ranges from a shrub 1 m tall in coastal areas to a 15 m tall tree at higher elevation. Its elevational distribution has been documented as 0 to 2,380 m on all the main Hawaiian Islands except Kaho‘olawe (Wagner et al. 1990:928-929). The fragrant wood was once used by Hawaiians for house posts (Buck 1957:83) and was harvested during the sandalwood trade with China when the supply of native sandalwood became low (Rock 1913:429).

MORACEAE

Artocarpus communis Forst. (*‘Ulu*)

This Polynesian introduction was a staple in the Society Islands. The fruit can be backed or boiled or mashed into a paste that cen be preserved for long periods. The light wood was used for canoes andf the bark could be used as a source for kapa. The sap was used for caulking canoes, as a lime for catching birds, and as a chewing gum (Neal 1965:303).

MYRTACEAE

Metrosideros polymorpha Gaud. (*‘Ōhi‘a lehua*)

This endemic species ranges in habit from prostrate shrubs to tall trees and in distribution from sea level to 2,200-m elevation in many ecological situations (Wagner et al. 1990:967). The hard wood was used for making spears and mallets, idols, posts .and rafters for houses, and enclosures around temples (Buck 1957:87; Malo 1951:20; Neal 1965:638).

Syzygium sp.

Four species of these trees may be found on O‘ahu. Two species, *Syzygium cumini* (Java plum) and *S. jambos* (rose apple), have naturalized in the mesic forests after their introduction prior to 1871 and in 1825, respectively. The Polynesian introduction *S. malaccense* (mountain apple, *‘ōhi‘a ‘ai*) may be found in low mesic to wet forests while the native *S. sandwicensis* (*‘ōhi‘a hā*) seems to be restricted to ridges and slopes on Kaua‘i, O‘ahu, Moloka‘i, Lāna‘i and Maui (Wagner et al. 1990:975-976).

Syzygium malaccense (L.) Merr. & Perry (*‘Ōhi‘a ‘ai*, mountain apple)

This tree is believed to have been introduced into Hawai‘i by the early Polynesian settlers. The 8 to 25 m tall trees can be found naturalized in low mesic to wet forests (Wagner et al. 1990:975-976). The trunks from these trees were once used for posts, house rafters, and temple enclosures; idols were also carved from the wood. The fruit was eaten and the bark, flowers and leaves were used medicinally (Rock 1913:323). A dye for clothing was extracted from the bark (Buck 1957: 187).

PITTOSPORACEAE

Pittosporum sp. (*Hō‘awa*)

The three species of *Pittosporum* which occur on O‘ahu are small trees. *P. confertiflorum* is found in dry to wet forests, *P. flocculosum* occurs on ridges and wet forests, and *P. glabrum* inhabits the mesic to wet forests (Wagner et al. 1990:1040-1044).

PTERIDOPHYTA

Several genera of native ferns form large erect stems (caudex). The inner portion of the caudex is composed of a starchy pith, which was eaten after cooking by humans or eaten raw by pigs. The fine golden hairs of *Cibotium* (*hapu ‘u*) caudex apex were used as a dressing for wounds and to embalm the dead (Neal 1965: I 0).

ROSACEAE

Osteomeles anthyllidifolia Lindl. (*‘Ūlei*)

This indigenous plant can often be found sprawling among the rocks along the coasts but may become an erect shrub up to 3 m tall in other environments. *Osteomeles* is found on all the main islands except Ni‘ihau and Kaho‘olawe and ranges in distribution from sea level to 2300 m in elevation (Wagner et al. 1990:1104-1105). In the past, the hard wood was used to make digging sticks (*‘ō‘ō*, fishing spears, carrying poles (*‘auamo*), and a musical bow (*‘ukeke*) (Buck 1957:12, 357, 14, 388). The flexible smaller branches were bent into hoops for fishnets (Neal 1965:387).

RUBIACEAE

Bobea sandwicensis (A. Gray) Hillebr. (*‘Ahakea*)

These endemic trees are up to 10 m tall and have been documented from the Wai'anae Mountains and southern Ko‘olau Mountains on O‘ahu, and on Moloka‘i, Lāna‘i. and Maui in dry

to mesic forest and on open lava flows (Wagner et al. 1990:1117-1118). *‘Ahakea* wood was formerly used for canoe rims (Pukui and Elbert 1986:6) and *poi* boards (Malo 1951:20).

Coprosma (Pilo)

These include 13 endemic Hawaiian species of shrubs and trees, of which at least three species (*C. foliosa*, *C. longifolia*, *C. ochracea*) are reported from O‘ahu, occurring in mesic to wet forests (Wagner et al. 1990:1121-1131)

Psychotria sp. (*Kōpiko*)

This large genus is distributed over tropical regions of both the New and Old Worlds. The 11 species of *Psychotria* in Hawai‘i are small to medium sized endemic trees that are found in the mesic to wet forests (Wagner et al. 1990: 1160-1170). Five species are known from O‘ahu. *Kōpiko* wood was previously used as firewood and to make *kapa* logs (Malo 1951:21).

SAPINDACEAE

Dodonaea viscosa Jacq. (*‘A‘ali‘i*)

These indigenous shrubs or small trees are 2 to 8 m tall and range in distribution from coastal dunes to dry, mesic, and wet forest, at 3 to 2,350 m elevations on all of the main Hawaiian Islands except Kaho‘olawe (Wagner et al. 1990:1227-1228). The red papery fruit capsule clusters and leaves of some varieties were made into *lei* (Pukui and Elbert 1986:3).

THYMELAEACEAE

Wikstroemia species

These 12 species of Hawaiian shrubs and small trees are found in a wide variety of environments. “Species of Wikstromia have furnished one of the strongest Hawaiian fibers, used in making ropes and braids” and was also used for kapa, for stupefying fish, and as a poison for executing criminals (Wagner et al. 1990:1283).